Livestock handling needs improvement

BY TEMPLE GRANDIN

Productivity and sickness losses are often the result of rough handling. Immune functions are lowered and reproductive rates can often be affected. Stress from rough handling can contribute to higher incidence of shipping fever. Bruises alone cost the livestock industry an estimated 46 million dollars annually (Livestock Conservation Institute). Packers are quick to attribute the causes of many bruises to rough handling.

Handling and transportation are stressful, even under good conditions. If handling is rough, stress is greatly increased. Kelley *et al.* (1981) found that stress from transportation may be detrimental to both antibody and cell-mediated immune responses in dairy calves. Feeder calves that were handled and transported had reduced immune function compared to calves which remained at home on the ranch. The control animals were taken off feed and water for the same length of time as the calves which travelled in the trailer. The stress of transport was over and above the stress imposed by feed and water deprivation alone (Blecha *et al.*, 1984). The authors conclude that the transported steers had suppressed lymphocyte and blastogenic responses. Transport stress can also lower rumen function compared to fasted controls (Galyean *et al.*, 1981). In this experiment, they used nine steers with rumen canulas. The animals were subjected to three treatments, control with feed and water, fasted control with no feed and water and transported. All treatments lasted 32 hours. The result indicated that rumen motility may be reduced in transported steers because they had higher VFA and rumen dry matter values and lower bacterial and protozoal counts compared to fasted controls. In pigs, handling, restraint stress and isolation will lower cell-mediated immunity (Mertsching and Kelley, 1983). Eight week old pigs were restrained in a small box for two hours. They could stand and lie down, but could not turn around. The restrained pigs had reduced PHA-induced skin swelling responses compared to unhandled and unrestrained controls. The restrained pigs also had smaller thymus glands.

Stressful effects of rough handling can be measured by other means too. Cortisol levels were higher in sheep which were handled under noisy conditions compared to quiet conditions (Pearson *et al.*, 1977). Allowing dogs to bite animals in confined areas is very stressful. Sheep which had been bitten by a dog had much higher cortisol levels than sheep which had only been chased (Kilgour and DeLangen, 1970). Feeder calves which had been roughly handled in poor facilities had much higher heart rates than calves which had been quietly handled in good facilities (Stermer *et al.*, 1981). When the calves became excited, it took over twenty minutes for their heart rates to return to normal.

Figure 1. Animals which are raised in close proximity to people are more willing to approach people. These animals have a smaller flight zone than animals raised on pasture with infrequent contact with people.

Temple Grandin is involved in her own consulting firm which specializes in stress management of livestock handling facilities. She has consulted both domestically and abroad.

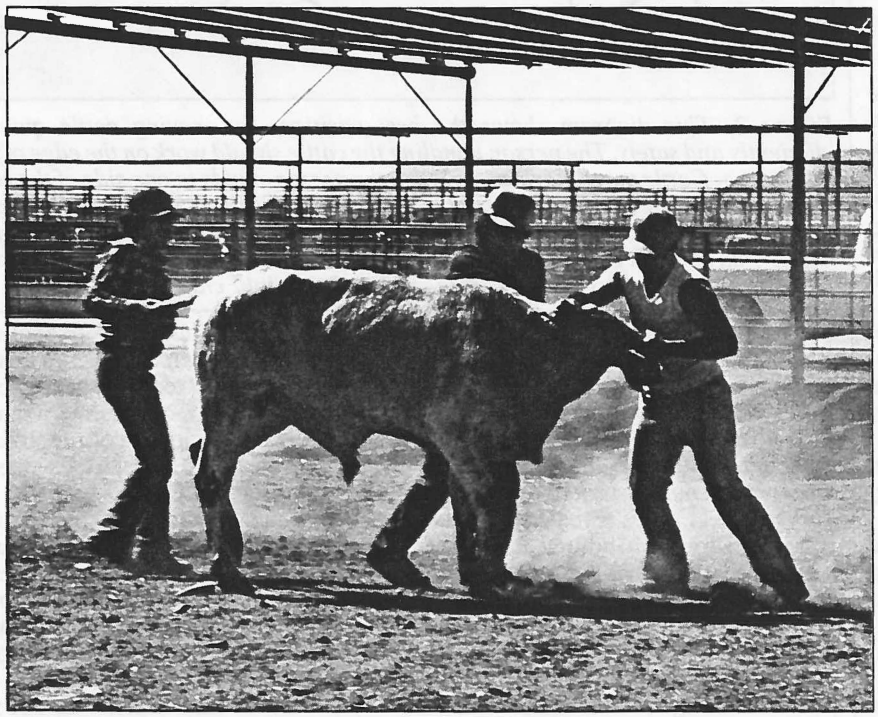

Figure 3. An animal's previous experiences with handling are one determinant of how it will react to handling. An animal which has been handled roughly is more likely to become agitated and excited the next time it is handled. Handling and transportation stress can reduce immune function.

It has been shown that rough handling and excitement can also lower reproductive rates. During artficial insemination, rough handling can raise body temperature and lower conception rates. Excitement prior to insemination also depresses secretion of hormones that stimulate contractions of the reproductive tract. These contractions move sperm to the site of ovum fertilization. Early embryonic death is more likely to occur if cows have an elevated body temperature (Stott *et al.*, 1975).

Stressful handling procedures 24 to 36 hours following removal of implants lowered conception rates when Synchro-Mate B (Searle) was used to synchronize estrus (Hixon *et al.*, 1981). Although conception rates were reduced, the cows still displayed estrus behavior. Hixon also observed that first service conception rates are also impaired if the animal is stressed during the surge of lutenizing hormone (Hixon *et al.*, 1981).

Flight zone

Livestock will maintain a safe distance between themselves and perceived threats, known as the flight zone. A major determinant of the size of the flight zone is the animal's past experiences with people and handling. Obviously, livestock which have frequent gentle contact with people will have a smaller flight zone than livestock which have infrequent contact or rough contact with people (Figure 1). Sheep which had been raised in a barn in close contact with people had a lower physiological stress response to handling than sheep which had been raised on pasture with little human contact (Reid and Mills, 1962).

Kilgour (1971) found that when the flight zone of bulls was invaded by a mechanical trolley the animals would keep a constant distance from the approaching trolley. When the trolley got too close the bulls bolted past it.

The best place for the handler to work is on the edge of the flight zone. This will cause the livestock to move away in an orderly manner. The animals will stop moving when the handler retreats from the flight zone. Figure 2 illustrates the correct handler positions (Grandin, 1980).

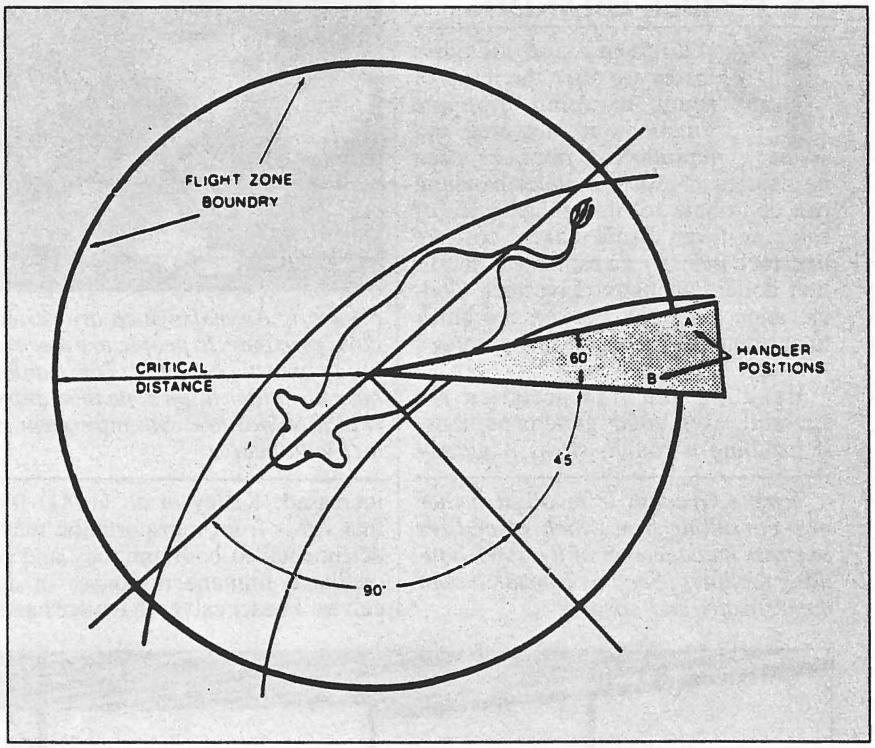

Figure 2. This diagram shows the best positions for moving cattle quietly, efficiently and safely. The person handling the cattle should work on the edge of the flight zone. Cattle move more easily when the person stands to one side of the rear of the animal instead of directly behind the animal. The flight zone is penetrated to make the animal move. The animal will stop when the person leaves the flight zone. Cattle tend to circle a person, which is why a curved chute with the person working along the inner radius is more efficient than a straight chute.

Livestock market study

The results of a recent survey (conducted by Humane Information Services) of 51 southeastern livestock markets across 11 states revealed that there was more rough handling at markets which had poor facilities. Markets in enclosed buildings with dim lighting also had a tendency for more abusive handling. Often, a few simple improvements in facilities can greatly improve handling. It was found that 33 percent of the markets had no water troughs or feeding facilities.

Twenty one percent of the surveyed markets had excellent handling and 32 percent had either rough handling or acts of cruelty (Table 1). Personal observation has shown that the incidence of rough handling tends to decrease in midwestern and more northern areas with estimated incidence of rough handling for all types of livestock operations at 10 to 15 percent.

When the condition of the market facilities was evaluated, it was found that thirty five percent had excellent, well maintained facilities and 28 percent had dirty, broken down or poorly designed facilities which caused a bad handling problem (Table 2).

The size of the market was not related to handling practices but markets which specialized in one species had a tendency to have better handling. One interesting finding was that both the excellent handling markets and the not

acceptable handling markets preferred battery operated electric prods. This indicates that the important factor is how a driving aid is used rather than what is used. A good handler will often tap an animal with the prod instead of shocking it. There was a tendency for handling to be more abusive when electric prods connected to an overhead wire were used. This may be due to the fact that this type of prod gives a less localized shock compared to a battery prod.

Facility design

Well designed and maintained handling facilities will help reduce stress and improve the efficiency and safety of livestock handling. Often a few simple improvements in facilities can greatly improve handling. Dim lighting in a handling facility increases balking and stubborness because animals do not like to enter dark places (Grandin, 1983). Shadows, bright spots and puddles in alleys and chutes can also cause balking.

The addition of solid sides on a loading ramp or chute to a squeeze will facilitate the flow of animals. A chute with solid sides is more efficient than a chute with open sides because it prevents the animals from seeing people and other distractions outside the chute. In loading chutes and alleys the animals should be provided with a non-slip surface.

Handling animals

An animal's previous experiences will partially determine the stressfulness of a handling procedure. Animals remember painful or frightening experiences (Figure 3). If an animal is abused in a squeeze chute it will become more stressed and aggitated the second time it is put in. Restraint in a squeeze chute is normally considered a stressful event for livestock. However, it is possible to train an animal to completely accept the restraint. Recent experiments by the author and Stan Curtis at the University of Illinois indicate that it is possible to train sheep to voluntarily enter a tilt squeeze table many times for a grain reward. Sheep marched into the leadup chute repeatedly by themselves (Figure 4). Some animals jumped up on the tailgate of the tilt squeeze table in attempts to get in, and they were squeezed and tilted up to nine times in one day.

Reid and Mills (1962) suggested that animals can be trained to accept irregularities in management. Animals can become accustomed to handling procedures. For example, calves shrunk less the second time they were transported (Hails, 1978). Research by Grandin and Curtis (1985) and Grandin *et al.* (1983) indicates that the environment in which an animal is raised will affect its reactions to handling. Pigs which were handled daily and given toys approached both a strange man and a novel object more readily than pigs which were raised in small barren pens with no handling or toys. The pigs which were handled, also walked through a narrow plywood chute more readily than pigs raised in the barren pens (Figure 5).

Progressive ranchers have found that cattle are easier to handle if they are trained to come into the corrals for feed or water. Animals learn that corrals are not always associated with unpleasant experiences. To reduce stress during artificial insemination cows can be walked through the facilities a few weeks in advance to familarize them with the facility (Grandin, 1984). After cattle are worked they should not be allowed to rush out of the corrals in an uncontrolled manner.

It may also be possible to condition animals to some of the sounds and events they will encounter during transportation and marketing. Perhaps cattle would be less stressed by trucking if they heard the sounds of trucks for a few weeks prior to transit. It may also be possible to reduce stress on pigs and other animals raised inside buildings by providing them with a more stimulating environment.

What the veterinarian can do to improve handling

Educate management: It is critical that managers of livestock operations recognize the importance of good handling. Many existing livestock operations with good handling procedures have a manager who insists on good handling. Operations with rough handlers usually have lax supervision of handling. It is sometimes the case in feedlots that the entire yard is well managed except for the cattle processing area. The veterinarian can often influence the manager to demand better handling because of the increased profits he can expect.

Marketing system: To motivate people to reduce losses caused by rough handling they must be held accountable for the losses. Losses caused by rough handling are presently passed on to the next person in the marketing chain. A

TABLE 1. Handling ratings for southeastern livestock markets

Excellent handling	Animals were moved quietly with a minimum of prodding. Care was taken to avoid slamming gates on animals and they were never kicked or hit with solid object 21%
Acceptable handling	Handling practices did not fall into the excellent or one of the not acceptable categories 47%
Not acceptable rough handling	Many animals were handled roughly by more than one person and management did not attempt to stop the abuse. A rough handling rating was given if any one of the following abuses was observed as a routine practice, constant prodding with an electric prod when the animals have no space to move, slamming gates on animals, overcrowding and causing animals to pile up, hitting animals with sticks or other objects and constant whipping of animals with whips 20%
Not acceptable cruelty	Animals were dragged, thrown or picked up by the tail or ears. This rating was also given if the majority of the employees handled most animals roughly and appeared to have no regard for them 12%

Source: Grandin, 1985.

TABLE 2. Facilities ratings for southeastern livestock markets

Excellent	All pens and chutes were clean and well maintained with a minimum of sharp protrusions which could injure animals. Facilities also had to have adequate lighting to be placed in this category. A market with a good pen layout design was also placed in this category. 35%
Acceptable	The majority of the pens and chutes were well maintained and clean. A market with a few broken boards of muddy pens was placed in this category. 37%
Dirty or needed major repairs	Many of the pens had broken fences or gates and there was a need for major repairs. A market was also placed in this category if it was littered with trash or chutes showed no evidence of being cleaned out on a regular basis 22%
Design unsatisfactory	This rating was given if a design defect caused a serious handling problem which increased the amount of rough handling and was likely to cause injuries to animals 6%

Source: Grandin, 1985.

feedlot which receives a load of stressed and mishandled calves is often unable to trace the origin of the calves. State and Federal agencies need to cooperate to develop better identification systems. The removal of back tags should be prohibited.

Encouraging the use of on-the-rail marketing for slaughter animals instead of live weight selling will also reduce losses. A survey of finished feedlot cattle indicated that animals sold on a live weight basis had almost twice as many bruises (Grandin, 1981). The feedlot selling on-the-rail is more motivated to reduce bruises because the bruises are deducted from his payment.

Encourage improvement of facilities: Often a few simple repairs and modifications of facilities will make handling easier. Many markets and feedlots need to clean up a dirty processing area.

Set a good example: A person must practice what he preaches. In order to encourage market and feedlot employees to handle livestock properly, professionals you must do the same. At one of the surveyed markets, a veterinarian was observed handling cattle roughly.

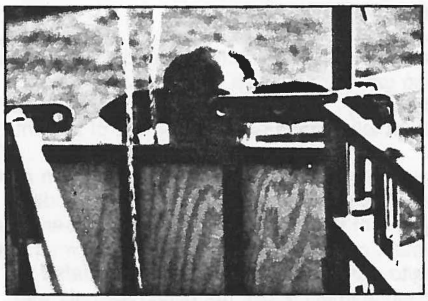

Figure 4. Animals which are handled gently and rewarded will be more cooperative and less stressed during handling. Animals can be taught to accept restraint. This sheep voluntarily went through a squeeze tilt table many times to receive a grain reward. She is eagerly waiting at the gate for her turn.

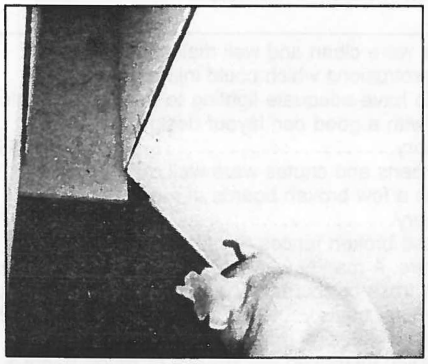

Figure 5. Pigs which were handled by people every day and provided with toys to play with were more willing to walk up a chute.

Summary

Rough handling of livestock is not only inhumane, but can cause excessive losses due to sickness and slower growth. Bruises at the packing plant cause slowdowns in the production line and economic loss. Careful handling of livestock in all phases of production is prerequisite to a profitable business.□

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Swine reproduction

Two areas of interest in the swine industry are synchronized breeding and controlled time of farrowing.

Dr. Stephen K. Webel, reproductive consultant for Animal Production Associates, Cropsey, IL notes that, "Timed breeding can be achieved through the use of products which either suppress or induce the estrus cycle in sows, while controlled farrowing can be routinely conducted through use of presently available prostaglandins."

One experimental method of planning a timed breeding program uses progestins; hormones which suppress estrus when included in the feed ration. Following withdrawal, the sows will come into heat at a predicatable time, allowing synchronized breeding.

In contrast to the use of progestins, which suppress estrus activity, another class of compounds, the gondatrophins, are useful in timed breeding programs because they stimulate the onset of estrus. Injection of these types of hormones to prepuberal gilts or sows at weaning generally induces estrus within four to six days, again allowing synchronized breeding.

LETTERS

Letter to Editor

Dear Sir:

If I made the simple statement as a DVM to the scientific and medical community that I think shipping fever in calves and some of our newly discovered cattle diseases are nutritional problems, I am afraid it might start a small war. At the same time if I made the same statement to a successful calf feeder I would get a smile instantly; that I must be a turkey for not knowing this a lot sooner.

However, I am personally meeting more and more veterinarians connecting disease, production, and reproduction problems with nutrition and would be very curious what would happen if all of us interested had the time to get together to go into the subject in detail, and simply organize our observations.

I am willing to bet the group would come to the conclusion that to improve nutrition for animals from this point on will take a team effort including the soil, plant, nutritional, geological, and medical scientists, and others I am not knowledgeable enough at this time to mention.

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